

A DEVICE AND A METHOD FOR AFFIXING OBJECTS TO PRODUCTS

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BACKGROUND OF THE INVENTION

The invention relates to a device for affixing objects to products moving in a row, which device is provided with a holder for a stock of said objects and with affixing means comprising a carrier for removing an object from

10 said holder and moving said object, ^{and} which affixing means are capable of rotary movement about an axis of rotation and of affixing said object to the moving product during said rotary movement.

15 A device of this kind can for example be used for placing objects, such as product samples, in a magazine. For example, bags of shampoo or bags of soup can be glued to a particular page of a magazine. This can be done when quires of said magazines are joined on a binding machine, 20 whereby said quires move along in a row.

The device may also be used for affixing address labels or other appendices to parcels, for example, before said parcels are enveloped in transparent plastic material.

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The device may for example also be used for providing flat sheets, from which a packaging box is to be formed, with stiffening parts which are glued to said flat sheet to form a stiffening element in the box when it is folded

30 at a later stage.

With such a device, it is important that the occurrence of malfunctions is reduced to a minimum, because the affixation of objects by means of such a device forms

35 part of a comprehensive, continuous process, which process can be stopped entirely by a malfunction.

Generally, such a device is only suitable for affixing one particular type of object.

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SUMMARY OF THE INVENTION

To this end, the affixing means can be driven intermittently, with rotation and standstill alternating with each other, during which standstill the carrier can remove an object from the holder. The temporary standstill of the affixing means enables the carrier to remove an object from the holder in a reliable manner, whilst the rotary movement of the affixing means causes the carrier to move in a circular arc, which is a suitable movement for affixing the objects being taken to products moving in a rectilinear path.

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Preferably, the affixing means are provided with more than one carrier, three carriers in a preferred embodiment, wherein the carriers are positioned a substantially uniform distance apart in a circle round the axis of rotation, in such a manner that one carrier is positioned near the holder during standstill of the affixing means, whilst the place where the objects are to be affixed to the products is located at a position on said circle, substantially centrally between two carriers. When three carriers are provided, the carrier which is positioned straight above the affixing means during standstill of the driving means can pull objects from a holder at the underside thereof, whilst a carrier which moves in a circular path, during which movement it can affix an object to a moving product, will be present at the underside of the affixing means during the rotation of the driving means that is carried out in order to place the next carrier in the upper position. It is also possible to place the holder in a position other than straight above the affixing means.

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Preferably, a carrier is provided with a suction nozzle, preferably two suction nozzles, for engaging an object. Since the affixing means are at a standstill while said engaging takes place, a sub-atmospheric pressure can be generated in said suction nozzle whilst the object abuts against the nozzle at rest. As soon as a desired sub-atmospheric pressure is available, the object can be pulled from the holder and the affixing means can start to rotate. By making the diameter of the suction nozzle sufficiently large, preferably more than 15 mm, a relatively large engaging force can be effected in a relatively short period. The use of two suction nozzles positioned next to one another makes it possible to effect a very stable engagement.

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Preferably, the carrier is movable in radial direction with respect to the axis of rotation, so that the carrier can move during standstill of the affixing means, to a position in which it abuts against an object which is present in the holder, from which position it can pull said object from the holder when the carrier moves in reverse direction.



In one preferred embodiment, the affixing means are provided with more than one carrier, wherein said carriers are positioned a substantially uniform distance apart in a circle round the axis of rotation, wherein the holder on the one hand and the place where the objects are affixed to the products on the other hand are positioned in such a manner with respect to each other, that one carrier will be present at the location of the holder during standstill of the affixing means, and another carrier, which has removed an object from the holder, will not have affixed said object yet.

Furthermore, a glue dispenser may be present, which is capable of applying an amount of glue to the object which has been engaged by a carrier. The object can then be glued to the product. Especially if the glue is to be

applied in a specific manner, for example in order to glue the object to the product in a specific manner, it will be advantageous to apply the glue during standstill of the carrier with the object, which can take place
5 whilst another carrier is engaging an object.

During standstill of the affixing means, an object which has been engaged by a carrier can furthermore be provided with a text, a number or other mark or code, for example
10 by means of an inkjet printer. The encoding of objects in this manner may be considered to constitute an invention by itself.

Preferably, the device is provided with its own electric
15 driving motor, and it is preferred not to have the device driven by the same driving means that move the products. This makes it possible to use the device in a flexible manner, in particular with regard to the location at which the device is installed. Preferably, the rotational
20 speed of the driving motor is controlled on the basis of signals from a pulse generator, which signals are a measure for the speed of movement of the products. Such a pulse generator can be mounted near a rotary shaft of the driving means that move the products, wherein the pulse
25 generator delivers signals which are a measure for the rotational speed of the shaft in question. The rotational speed of the driving motor can be adapted to the speed of movement of the products as desired via electronic control of the driving motor. Thus it is ensured that the
30 rotation of the affixing means and the movement of the products take place in a synchronized manner.

In one preferred embodiment, control means are present, which are capable of putting a carrier temporarily out of
35 action, so that said carrier will not engage an object from the holder during standstill at the holder. This makes it possible to select whether or not to affix an object to a product, for example when a product is

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missing in the row of moving products, without interfering with the movement of the affixing means.

In another embodiment, control means are present, which
5 control means are provided with detection means, which detect that a moving product is approaching the affixing means. The rotation of the affixing means can be controlled in such a manner that a rotation is started when a product is approaching, whilst the approach of a
10 next product is awaited during standstill.

By using the device it becomes possible to control and/or adjust the speed of motion of the object during rotation on the one hand and the time span between two successive
15 affixing moments of an object on the other hand independently of each other.

In one preferred embodiment, the affixing means are driven via an index mechanism, whose outgoing shaft is
20 intermittently stationary, whilst the ingoing shaft rotates continuously. Such an index mechanism, which is known per se, is commercially available. Preferably, the ingoing shaft of the index mechanism also drives a driving mechanism for driving parts of the device, for
25 example the carrier, during standstill of the affixing means, so that the carrier can move during standstill of said outgoing shaft. Thus, the movement of the carrier can take place at precisely the right moment during standstill of the affixing means.

30 To that end, the ingoing shaft of the index mechanism is preferably provided with a cam disc, against which a cam abuts, which cam is provided on a driving mechanism for driving parts of the carrier during standstill of the
35 affixing means. The cam may be provided on a lever which is rotatable about a shaft, whereby rotation of said shaft causes the carrier to move.

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Preferably, said driving mechanism comprises a lever which is rotatable about a shaft, which lever is provided with a cam, whose movement causes the carrier to move.

- 5 The invention furthermore relates to a method for affixing objects to products moving in a row, whereby an object is removed by affixing means from a holder of a stock of objects and subsequently moved by said affixing means to a position in which it abuts against a moving
- 10 product, whilst the affixing means are rotated about an axis of rotation, at such a speed that the speed of movement of the object is substantially equal to the speed of movement of the product, wherein the affixing means are driven intermittently, with rotation and
- 15 standstill alternating with each other, during which standstill the affixing means remove an object from the holder. The speed at which said affixation takes place is higher than 5,000 objects per hour thereby, preferably higher than 10,000 objects per hour.
- 20 The affixing means can thereby be driven via an index mechanism, the outgoing shaft of which is intermittently stationary, whilst the ingoing shaft rotates continuously, wherein said ingoing shaft can also drive a
- 25 driving mechanism, which drives parts of the device, for example the carrier, during standstill of the affixing means.

~~Further aspects of preferred embodiments will be described by means of an example and be defined in the claims.~~

In order to provide a better understanding of the invention, an embodiment of a device for affixing objects to moving products will be described hereafter with reference to the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side view of the device;

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a Figure 2 is a front view of the device;
Figure 3 is a rear view of the device; and
Figure 4 is a plan view of the device.

- 5 The figures are merely diagrammatic representations,
wherein certain parts have been left out in each figure
so as to show other parts more clearly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

- Q Figure 1 is a side view of the machine, that is, the
10 machine is shown in the direction of movement of the row
of products. The path in which the products move lies
near line 1. Present above said path 1 are affixing means
2, which rotate about axis of rotation 3. The affixing
means 2 are provided with three carriers 4, which are
15 positioned relative to each other as shown in Figure 2.

- Present above the affixing means 2 is a holder 5, in
which a stack of objects 6 is present, for example a
stack of bags of shampoo. Said holder 5 is only shown in
20 Figure 1. Figure 1 furthermore shows a radial, upward
movement of carrier 4, which makes it possible to move
nozzle 7 in abutment with the lowermost object 6 in
holder 5. When suction nozzle 7 abuts against the
lowermost object 6, a sub-atmospheric pressure can be
25 generated in said suction nozzle, as a result of which
the lowermost object 6 can be pulled from holder 5 when
carrier 4 moves downwards to its starting position.

- Sub 32 Figure 2 shows how the affixing means 2 can rotate
30 through an angle of 120° in order to move the next
carrier 4 to the upper position, from where said next
carrier 4 can take along an object 6 from holder 5. Then
the affixing means are rotated further through 120°,
whereby the object 6 that was take along first is affixed
35 to a product moving in path 1 in the direction indicated
by arrow 8. The sub-atmospheric pressure is thereby
released the moment carrier 4 occupies the lower
position.

Each carrier 4 is provided with an air hose 9, through which air can be sucked out of nozzle 7 or be supplied to said nozzle 7. To that end, a discharge hose 10 is provided, through which air is sucked out. Discharge hose 10 is in communication with chamber 11, which extends along a circular arc in a stationary housing 12, which is pressed against rotatable affixing means 2 by means of coil spring 13. During rotation, the air hoses 9 are temporarily in communication with chamber 11, and that from the moment the respective carrier 4 occupies the upper position until the moment said carrier 4 occupies the lower position. When carrier 4 passes said lower position, the hose 9 of the carrier 4 in question comes into contact with chamber 14, in which an atmospheric pressure prevails. Also chamber 14 is provided in housing 12, it extends along a circular arc. Chambers 11 and 14 are illustrated in dashed lines in Figure 2, the sectional view of Figure 1 shows chamber 1 and the sectional view of Figure 4 shows chamber 11 as well as chamber 14, whereby said figure also shows chamber 14 to be in communication with the atmosphere.

30 The circular path on which nozzles 7 are located during rotation of affixing means 2 is illustrated in a chain-dotted line 15 in Figure 2.

Each carrier 4 is provided with a coil spring 16, which
35 retains the carrier in question in its starting position,
whereby stop 17 abuts against affixing means 2. Carrier 4
can be moved upwards when occupying its upper position,
so that nozzle 7 is placed in abutment with an object 6

a in holder 5. Said upward movement is driven by lever 18, which is mounted on shaft 19, whereby a cam 20 of said lever, ^{on lever cam,} abuts against part 21 of carrier 4. Rotation of shaft 19 causes lever 18 to move upwards, and carrier 4 moves upwards correspondingly, so that suction nozzle 7 can engage an object 6 from holder 5.

Figure 2 shows a glue dispenser 22, by means of which a predetermined amount of glue can be sprayed onto object 6 in order to cause object 6 to adhere to the product which is moving along in path 1. The glue is applied to the object during standstill of the affixing means 2. Instead of a glue dispenser, an inkjet printer may be provided, by means of which a code can be placed on the object.

15 The device is driven by means of a driving motor 25, whose speed is controlled by means of a speed controller 26 on the basis of signals which indicate the speed of movement of the products in path 1. To that end, speed controller 26 can be connected to a pulse generator (not shown), which is mounted on the driving means of the moving objects.

As is shown in Figure 3, outgoing shaft 27 of driving motor 25 is drivably connected to the ingoing shaft 29 of an index mechanism 30 (Figure 1) by means of a toothed belt transmission 28. Index mechanism 30 comprises an ingoing shaft 29 and an outgoing shaft 31, on which outgoing shaft the driving means 2 are mounted.

30 The index mechanism which is used in this embodiment is a commercially available product. When ingoing shaft 29 of index mechanism 30 makes one revolution at a substantially constant speed, outgoing shaft 31 will rotate through an angle of 120°, whereby shaft 31 will be stationary for some time and carry out said rotation for some time. The position which is shown in Figures 1 and 2 is the position in which affixing means 2 are stationary.

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Ingoing shaft 29 is furthermore provided with a cam disc 35, against which cam 36 abuts (Figure 3). Cam 36 is provided on lever 37, which is attached to shaft 19 and which is pressed against cam disc 35 by means of draw spring 38. Lever 37 is moved upwards with every revolution of ingoing shaft 29, and since lever 37 is connected, via shaft 19, to lever 18 (Figure 2), a carrier 4 is moved upwards by means of cam 20. The control is thereby such that said movement takes place while affixing means 2 are stationary.

In addition, a control element 39 is present, which holds lever 37 in its lowermost position, if desired, so that cam 36 will not follow the surface of the cam disc 35, and carrier 4 will not make an upward movement. Control element 30 is excited when a carrier must not take an object from holder 5, it is preferably pneumatically driven.

The device is furthermore provided with a frame 40, which is preferably mounted on a movable support which is disposed on the floor, in which support frame 40 can be fixed in such a manner that the device will be positioned at a desired location. As a result of that, no additional means are required for attaching the device to another device, and the device can easily be used at varying locations.

The illustrated embodiment of the device is only an example, which is given by way of illustration, several other embodiments of the device are possible.

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